

**DISPERSION OF SABAKI RIVER SEDIMENTS IN THE
INDIAN OCEAN**

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By

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ABSTRACT

The study aimed at investigating transport and deposition of sediments discharged by the Sabaki River into the Indian Ocean. It covers an area of about 14 km², bounded by latitudes 3°13'S and 3°6' S and longitudes 40°7'E and 40°10' E. The area is mainly the continental shelf of the Malindi Bay. Mid-way along the shoreline is the Sabaki river mouth. The Sabaki River sediment discharge rates, beach and bottom Sediments grain size distribution and mineralogy, total suspended solids, salinity, rainfall and wind were studied.

In 1998, the Sabaki River sediment discharge was 1.47×10^7 tons, while determination of annual discharge from total discharge during the whole study period showed a rate of 1.32×10^7 tons. The highest sediment discharge occurred during the NE monsoon period, attaining a possible range of 5.52×10^4 to 3.27×10^7 tons, while the lowest discharge occurred during the SE-NE monsoons transition period, attaining a possible range of 5.37×10^4 to 3.52×10^5 . Sediments in the study area are moderately well sorted to very well sorted. Results of Correlation between Sabaki river sediment discharge and rainfall in both Malindi and Dagoretti imply that most Sediments transported by the river are generated from the river's catchment areas far inland from the coast. Grain size decreases both across and along shore from the river mouth and ranges from medium to very fine. Seaward from mid-continental shelf silt and clay levels in the sediment increase. Quartz, dark minerals, and mica are the main constituent minerals, with traces of calcareous grains. Quartz grains were most abundant, occurring at more than 50% most times. Malindi-Mambrui beach experienced net sediment gain in ranges from 0.021 to 0.090 and 0.012 to 0.075m in height in southern and northern sectors respectively.

Surface suspended solids plume zonation maps and satellite images show that the plume moves both to the north and south of the Sabaki River mouth, depending on the monsoon wind direction, and travels beyond the limits of the study area. Generally, total suspended solids levels decreased both along and across shore. The lowest mean value of total suspended solids in the study area was 0.010 g/l, while the highest mean value was 1.85 g/l. Sediments can travel past the North and south limits of the study area at sediment concentration ranges of 0.010 to 0.500 g/l and 0.010 g/l to 0.900 g/l respectively. Deposition of silty sediments occurred from the mid-continental shelf seaward. Water discharged by the Sabaki River has similar behavior as suspended solids, with the plume moving mainly in a north-south direction more than across-shore. The paths of the surface suspended solids plume and the low salinity water do not however overlap. The main direction of movement of both surface suspended solids plume and low salinity water is similar to that of the monsoon wind-generated surface currents.

Within a radius of about 0.8km from the river mouth, salinity ranged between 0.00‰ and 15.00‰. Low salinity water of up to 34‰ did not occur beyond the seaward, Northward and Southward boundaries of the study area. However salinity of 34.00‰ to 34.90‰ occurred beyond the boundaries.